

IN THE CLAIMS:

This listing of claims will replace all prior versions and listings of claims in the application:

Listing of Claims:

1(Currently Amended). A multicarrier signal receiver for receiving a serial signal sequence of modulated subcarriers carrying information for input pilot and data symbols, comprising:

a subcarrier-to-symbol converter for converting said serial signal sequence into received pilot and data symbols representative of said input pilot and data symbols; ~~and~~
an inverse Fourier transformer for selecting said received pilot symbols from said received pilot and data symbols and then inverse Fourier transforming said received pilot symbols into received pilot multicarrier blocks

a pilot multicarrier generator for generating a computed pilot multicarrier block having complex conjugates of system pilot symbols corresponding to said input pilot symbols;

a correlator for correlating said received pilot multicarrier blocks with said computed pilot multicarrier block for providing a correlation function;

a frequency offset estimator using said correlation function for providing a frequency synchronization adjustment; and

a signal source for providing a reference signal having a frequency responsive to said frequency synchronization adjustment; wherein:

the subcarrier-to-symbol converter uses said reference signal for frequency synchronizing to said serial signal sequence and providing a frequency synchronized serial signal sequence, said received pilot and data symbols derived from said frequency synchronized serial signal sequence.

2(Original). The receiver of claim 1, wherein:
said modulated subcarriers are an orthogonal frequency division multiplex (OFDM)
signal formed by inverse Fourier transforming said input pilot and data symbols.

3(Original). The receiver of claim 1, wherein:
the subcarrier-to-symbol converter includes a Fourier transformer for Fourier
transforming a representation of said serial signal sequence to said received pilot
and data symbols.

4 – 5. Canceled.

6(Currently Amended). The receiver of claim [[5]] 1, wherein:
the frequency offset estimator includes a peak phase detector for determining phases of
peaks, respectively, of said correlation function; a block differencer for
determining a phase difference between two said phases; and a discriminator for
providing said frequency synchronization adjustment based upon said phase
difference.

7(Currently Amended). The receiver of claim [[5]] 1, wherein:
the frequency offset estimator includes a frequency adjustment sweeper for varying said
frequency synchronization adjustment; and a synch peak detector for monitoring
said correlation function and fixing said frequency synchronization adjustment
when a peak of said correlation function exceeds a threshold.

8(Currently Amended). The receiver of claim [[4]] 1, wherein:
the subcarrier-to-symbol converter includes a time synchronization serial-to-parallel
converter for time synchronizing said serial signal sequence into received
multicarrier blocks according to times of peaks of said correlation function; and a
Fourier transformer for Fourier transforming said received multicarrier blocks into
said received pilot and data symbols.

9(Currently Amended). The receiver of claim [[4]] 1, further comprising:
a discrete noise reduction filter for receiving a raw said correlation function at discrete sample indexes and issuing a filtered said correlation function having filtered peaks at said discrete sample indexes for raw peaks of said raw correlation function greater than a threshold and having a zero level at said discrete sample indexes for said raw peaks of said raw correlation function less than a threshold.

10(Original). The receiver of claim 9, further comprising:
an interpolator for interpolating said filtered correlation function for providing a channel impulse response;
a Fourier transformer for transforming said channel impulse response for forming channel estimates; and
an equalizer for using said channel estimates for equalizing said received pilot and data symbols.

11(Currently Amended). A method for receiving a serial signal sequence of modulated subcarriers carrying information for input pilot and data symbols, comprising:
converting said serial signal sequence into received pilot and data symbols representative of said input pilot and data symbols;
selecting said received pilot symbols from said received pilot and data symbols;
inverse Fourier transforming said received pilot symbols into received pilot multicarrier blocks.
generating a computed pilot multicarrier block having complex conjugates of system pilot symbols corresponding to said input pilot symbols;
correlating said received pilot multicarrier blocks with said computed pilot multicarrier block for providing a correlation function.
converting said correlation function to a frequency synchronization adjustment;
providing a reference signal having a frequency responsive to said frequency synchronization adjustment;
using said reference signal for frequency synchronizing to said serial signal sequence and
providing a frequency synchronized serial signal sequence; and

using said frequency synchronized serial signal sequence for providing said received pilot and data symbols.

12(Original). The method of claim 11, further comprising:
inverse Fourier transforming said input pilot and data symbols for forming said modulated subcarriers as an orthogonal frequency division multiplex (OFDM) signal.

13(Original). The method of claim 11, wherein:
converting said serial signal sequence into received pilot and data symbols includes Fourier transforming a representation of said serial signal sequence to said received pilot and data symbols.

16(Currently Amended). The method of claim [[15]] 11, wherein:
converting said correlation function to said frequency synchronization adjustment comprises:
detecting phases of peaks, respectively, of said correlation function;
determining a phase difference between two said phases; and
providing said frequency synchronization adjustment based upon said phase difference.

17(Currently Amended). The method of claim [[15]] 11, wherein:
converting said correlation function to said frequency synchronization adjustment comprises:
varying said frequency synchronization adjustment;
monitoring said correlation function; and
fixing said frequency synchronization adjustment when a peak of said correlation function exceeds a threshold.

18(Currently Amended). The method of claim [[14]] 11, further comprising:
time synchronizing said serial signal sequence into received multicarrier blocks according to times of peaks of said correlation function; and

Fourier transforming said received multicarrier blocks into said received pilot and data symbols.

19(Currently Amended). The method of claim [[14]] 11, further comprising:
receiving a raw said correlation function at discrete sample indexes; and
issuing a filtered said correlation function having filtered peaks at said discrete sample indexes for raw peaks of said raw correlation function greater than a threshold and having a zero level at said discrete sample indexes for said raw peaks of said raw correlation function less than a threshold.

20(Original). The method of claim 19, further comprising:
interpolating said filtered correlation function for providing a channel impulse response;
Fourier transforming said channel impulse response for forming channel estimates; and
equalizing said received pilot and data symbols based upon said channel estimates.

21 – 44. Canceled.

45 (New). A method of processing a received multicarrier signal, the multicarrier signal comprising a plurality of subcarriers carrying pilot and data symbols, the method comprising:
converting pilot symbols into received pilot multicarrier blocks;
generating a computed pilot multicarrier block having complex conjugates of system pilot symbols corresponding to received pilot symbols;
correlating the received pilot multicarrier blocks with the computed pilot multicarrier block to provide a correlation function;
estimating a frequency offset using the correlation function to provide a frequency synchronization adjustment;
generating a reference signal having a frequency responsive to the frequency synchronization adjustment; and
synchronizing the received multicarrier signal using the reference signal to provide a synchronized received multicarrier signal.

46(New). A method according to claim 45, wherein providing the frequency synchronization adjustment comprises:

- detecting phases of peaks, respectively, of the correlation function;
- determining a phase difference between two said phases; and
- providing said frequency synchronization adjustment based upon said phase difference.

47(New). A method according to claim 45, wherein providing the frequency synchronization adjustment comprises:

- varying said frequency synchronization adjustment;
- monitoring said correlation function; and
- fixing said frequency synchronization adjustment when a peak of said correlation function exceeds a threshold.

48(New). A method according to claim 45, further comprising:

- synchronizing the received multicarrier signal to provide a synchronized received multicarrier signal according to times of peaks of said correlation function.

49(New). A method according to claim 45, further comprising:

- receiving a raw said correlation function at discrete sample indexes; and
- issuing a filtered said correlation function having filtered peaks at said discrete sample indexes for raw peaks of said raw correlation function greater than a threshold and having a zero level at said discrete sample indexes for said raw peaks of said raw correlation function less than a threshold.

50(New). A method according to claim 49, further comprising:

- interpolating said filtered correlation function for providing a channel impulse response;
- forming channel estimates from said channel impulse response; and
- equalizing said pilot and data symbols based upon said channel estimates.